FACT SHEET

Module 5 Vision Control

What is Vision?

Vision is an important part of classroom learning
Vision is so complicated it involves 20 visual abilities and more than 65% of all pathways to the brain. The visual system is a significant part of how we process information and a key factor in how we learn. It is far more than just seeing objects clearly, but also involves processes such as how we move our eyes together, how we focus, how we achieve depth perception, how we perceive the world around us, how we process, store and recall information, to name just a few!

Eight-five percent of classroom learning come through the visual system. Poor visual skills can lead to difficulties with reading, learning, overall school performance and even sports. This happens when a good foundation of vision is not developed properly and stress causes the unstable system to break down under too much load. Fortunately, problems with visual skills can be fixed with proper vision training. People learn how to use their visual system more efficiently, so they will be better equipped to handle heavier loads on their visual system.
Vision is a great deal more than having 20/20 eyesight!

Vision is a dynamic, always changing process of organizing, interpreting and understanding what is seen. It is a process that integrates sensory and motor information generated by the brain and body to derive meaning and direct movement.

Vision is actually developed like walking and talking. It is learned over time from birth by our experiences and how we react and solve problems. It differs from eyesight because eyesight is our ability to see, a sense with which most of us are born, and vision is actually a LEARNED process. The visual skills we learn early on provide the foundation for later visual complexities. Any weak link in the visual process can affect the outcome, especially if the visual system is under stress.

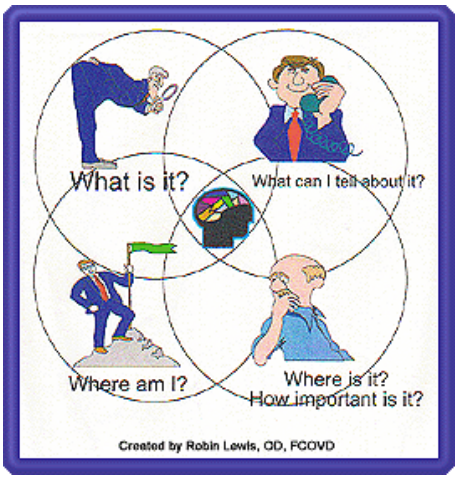
Think of having the right machine, such as a car, but not knowing how to use it. In order to make the car more useful, you have to figure out how to coordinate all the levers, knobs and pedals. Vision is the same way. You may have two eyes, but learning how to coordinate them together and interpret the information coming in takes skill and practice.

Basically, we use vision to guide motor behavior, like catching a ball; interpreting space and time, when giving directions by saying "it will take 10 minutes if we turn left at the light coming up in two blocks"; and integrating information from our other senses (hearing, touch, taste and smell). Vision helps us to think, understand and react to the world around us.

Vision allows us to take what we see and process this information so we can:

- Identify what we see by where it is, how far away it is, how big it is, how fast it is moving, what texture it has, etc.
- Store this current information for future retrieval.
- Integrate the sight information with all our other senses - touch, hearing, taste and smell.
- Compare this information to previously stored information in order to confirm prior experience or reconstruct a prior experience if necessary.
- Derive meaning from both the new information and past information.
- Decide the relationship between where we are and where it is, or find out where we are in space.
- Act on this new meaning.
- Use this new perception to direct movement or thought.

Sound complicated?



Vision is there every step of the way when learning and processing information.
Eight percent of what is perceived, comprehended and remembered depends on the visual system. Our visual system helps us get the information in, perceive and derive meaning from it, then get the information out again so it is useful. Notice this is also how intelligence is often measured. Getman, a renowned behavioral optometrist, stated,"Vision is the dominant mode in the development of intelligence." The more efficient a person is, the higher their score on many intelligence tests. This is why IQ scores can change. The visual process is constantly active and evolving as you integrate and utilize the information you gather, learn from it and modify this information by experience. This is the process known as VISION.

Visual skills are important in reading and learning.
Getting to the point where we gain the ability to understand and interpret what we see correctly and efficiently involves many visual skills. If one or more of these skills are deficient, then the signal through the visual pathway may not be as clear as it could be. This can cause difficulty with learning or performing various tasks, such as reading. Since 75-90% of classroom learning comes through the visual system, poor visual skills can affect a child's performance. Why?

It takes more energy to use a faulty visual system than it does an efficient one.
A good way to think of visual skills is the following analogy:
Having poor visual skills is like filling a glass of water using a spoon with one or more holes in it. A child may know how to do the task set before them and be a very physically and mentally capable child, but are not able to do the task as well as the child sitting next to them with a regular spoon. A very motivated child may still fill the glass full of water, but it will take more time and effort than a child with a spoon without any holes. Another child may become frustrated and give up or may fill some of the glass every once in awhile if they have more energy that day. The problem is most kids do not know they have a faulty spoon and neither do their parents or teachers.

Vision is one piece of the learning disability puzzle.
Visual skills can heavily influence a child's ability to learn and process information, especially a child with a learning disability. However, not everyone is affected the same if they do have any inefficiencies with their skills. For some individuals it can be the main contributor, while in others it hardly contributes at all. It is important for all parents and professionals who work with children to understand that vision is just part of the puzzle and one type of intervention does not work for everyone.

A Multi-Disciplinary approach to learning problems is ideal.
Even when visual difficulties are taken out of the equation, other skills, such as basic academic skills, may still be underdeveloped. A multi-disciplinary approach is more the rule than the exception and all areas of difficulty should be considered when developing a diagnosis and treatment plan. This includes educational intervention.

What is Depth Perception and Why Do We Need It?

DEPTH PERCEPTION: an important aspect of normal, healthy vision; a result of good stereo vision; the ability to visually perceive depth and three dimensional space; the ability to visually judge relative distances between objects; a perceptual skill that aids accurate movement in three-dimensional space.
You need depth perception because . . .According to the web site of the American Academy of Ophthalmology, August, 1996: "many occupations are not open to people who have good vision in one eye only [that means no stereo vision, no binocular depth perception]"

Here are a few examples of occupations that depend heavily on stereo vision:

1. Baseball player
2. Waitress
3. Driver
4. Architect
5. Surgeon
6. Dentist

The loss of binocular depth perception robs a person of more than just the possibility of being a professional baseball player or dentist The Stereo Vision Project asserts that the lack of binocular vision is a serious visual disability that deserves more attention. Loss of binocular vision decreases quality of life as well as life choices. Parents and patients need to be informed about early detection of these conditions as well as the full range of treatment options.

Here are a few examples of general actions that depend heavily on depth perception:

1. Throwing, catching or hitting a ball
2. Driving and parking a car
3. Planning/building a three-dimensional object
4. Threading a needle and sewing
5. Reaching out to shake another person's hand
6. Pouring into a container
7. Stepping off a curb or step

The Famous Frankfurter Experiment

The Famous Frankfurter Experiment demonstrates exactly how the eyes are used during parallel-viewing (Magic Eye 3D viewing). If this experiment is successful, you'll see a miniature frankfurter floating in the air as pictured above. Wow.

- You need to look into the distance for this, so turn away from the computer monitor.
- Pick a specific object in the distance. Aim your eyes at that target.
- While looking at that distant target, bring your index fingers, tips touching, up in front of your eyes and into your line of sight.
- While still aiming your eyes at the distant target, calmly notice that a mini-frank has appeared between the tips of your fingers. Do not allow the awesome beauty of the mini-frank to distract you and cause you to aim your eyes directly at it. Continue to aim your eyes into the distance at your target.
- Pull the tips of your fingers apart slightly and observe the frankfurter floating in the air.
- Wiggle your fingers and watch the mini-frank dance.

Remember how your eyes feel while performing this depth-defying frankfurter feat and you can apply the same skills to 3D viewing.